

# Management of Ptosis

Martyn King, MD

### Definition

Ptosis is derived from the Greek word for falling and is the medical terminology describing a drooping or abnormal lowering of an anatomical area. When ptosis pertains to the eyelid it is more accurately described as blepharoptosis.<sup>1</sup>

Seriousness of complication		Frequency of complication	
Minor complication		Common	
Worrying complication		Occasional	
Moderate complication	X	Infrequent	X
Serious, but not major		Rare	
Major complication		Very rare	

### Introduction

In aesthetic medicine, ptosis is almost exclusively related to the inadvertent injection of botulinum toxin type A into an unwanted area leading to muscle weakness and a resultant droop, particularly in the hands of an inexperienced injector. Depending on the area treated, ptosis can affect the brow resulting in a lowering of the eyebrows, which produces a poor cosmetic result but can also lead to a significant descent of the eyebrows that may interfere with vision. Upper lid ptosis may occur when treating the glabellar complex and botulinum toxin type A diffuses through the orbital septum and affects the lid elevator muscle either as it traverses the pre-periosteal plane or the toxin may track along tributaries of the superior ophthalmic vein.<sup>1</sup> This may result in a drooping of the upper lid with the patient unable to fully open the eye, a poor cosmetic result that may interfere with normal vision.

Although ptosis may persist for the whole duration of effect of treatment with botulinum toxin type A, it will usually settle more quickly and eyelid ptosis will often settle within 3 to 4 weeks and brow ptosis within six weeks.<sup>2,3</sup>

### Incidence

Allergan's Multicenter United States Food and Drug Administration (FDA) study revealed a 5.4-percent incidence of ptosis (12 out of 263); however, it was acknowledged that many of these complications were a result of an inexperienced injector. The reported incidence of experienced injectors is far less than this and more likely to be less than one percent.<sup>4</sup>

### Signs and Symptoms

The patient will normally present within 3 to 7 days

## Management of Tyndall Effect

*An Aesthetic Complications Expert Group Consensus Paper*

complaining of a drop of the brow or eyelid. Ptosis can be unilateral or bilateral. Sometimes ptosis is subtle and may not be immediately apparent, but the patient will feel that the lid or brows feel heavy and may not be able to fully open their eye and may struggle to put on eye makeup. The patient may describe fatigue and heaviness around the eye, which worsens throughout the day.<sup>5</sup> In some situations, the ptosis can be severe and lead to restriction of vision.

### Risk Factors

- ¥ Patient factors (age, lifestyle factors, heavy brow, short brow, outdoor work resulting in sun damage, loss of elasticity, heavier skin, and a greater reliance on the action of the frontalis muscle)
- ¥ Medical conditions (previous facial surgery, neurological conditions, such as myasthenia gravis and caution in multiple sclerosis, previous history of ptosis or Bell's palsy)
- ¥ Product factors (product dilution, product quality)
- ¥ Treatment factors (injection technique, injection placement, dosage)

### Minimizing the Risk of Ptosis

Ensure a full medical history is taken to include any pre-existing conditions and obtain consent after advising on the risks of side effects and complications including a potential ptosis. Next, assess the patient's anatomy and musculature, pay particular attention to the brow position (the anatomical brow rather than the actual brows, which may have been cosmetically altered) and any pre-treatment asymmetry (approximately 90% of the population have a degree of brow asymmetry).<sup>2</sup> Assess brow size and heaviness with particular attention to the resting tone of frontalis to ensure that the patient is not using this muscle at rest to support the brows (ask the patient to sit upright, look forward, and close eyes, if the eyebrows descend during this check, do not treat the forehead lines).<sup>2</sup> Photographs should always be taken prior to treatment. Inform the patient to avoid sunbathing, saunas, and massage post-treatment for at least four hours because these activities may lead to greater spread of the toxin.<sup>4</sup>

**Brow ptosis.** "The only important side-effect of forehead treatment with botulinum toxin type A is brow ptosis and this can be reduced with simple rules."<sup>4</sup>

1. When treating the frontalis muscle, always inject at mid-forehead or above (at least 2cm above the brow in all patients and

for older patients, ensure injections are at least 4cm above the brow).<sup>2</sup>

2. By injecting intradermal rather than intramuscular when treating the forehead, one study reported a lower incidence of ptosis with no reduction in results.<sup>4</sup>

3. Always inject the glabellar at the same time as the forehead (never treat the frontalis muscle in isolation), particularly in patients over 50 years of age<sup>2</sup> (treating the brow depressors at the same time as the elevator muscle). If the practitioner anticipates problems with the forehead, injecting the glabellar first and then reassessing the forehead in two weeks is recommended. As with all botulinum toxin type A treatments, if in doubt, use conservative amounts and reassess the need for additional units at review.

4. Be cautious in any patient who has had previous frontal facial surgery.<sup>6</sup>

### Eyelid Ptosis

1. Injections should always remain 1cm above the brow and not lateral to the mid-pupillary line when treating the glabellar.<sup>2</sup>

2. During injection of the corrugator supercilii muscles, use digital pressure over the supraorbital rim with the non-injecting hand to reduce the risk of diffusion.<sup>2</sup>

3. When injecting around the glabellar complex, the needle should be pointing superiorly away from the orbit.<sup>7</sup>

4. When treating under the eye during the treatment of crow's feet, the botulinum toxin type A should never be injected medial to the mid-pupillary line and must remain at least 1cm away from the margin of the orbit. Never inject immediately below the eye if there is a significant degree of scleral show pre-treatment, if there has been previous eye surgery or if there is a negative snap-test (eyelid extraction test) with a delay in the skin below the eye returning to its normal position after being manually pulled down.

**Lip ptosis.** 1. When treating crow's feet, ensure injections remain within the confines of the orbicularis oculi muscle. If treating too inferiorly, it is possible that the zygomaticus major muscle may be affected. This muscle arises from the anterior zygoma and is responsible for lifting the corner of the mouth up and laterally. Ptosis in this area becomes more apparent when the patient is asked to smile.

2. Lip ptosis may also occur when treating smoker's lines and over-administration of botulinum toxin type A to the orbicularis

oris muscle. Only small doses are required in this region and it should only be performed by experienced injectors.

### Treatment of Ptosis

A full explanation and reassurance to the patient advising the likely duration of effect will suffice for many patients if the ptosis is relatively mild.

**Eyelid ptosis.** Stimulation of the muscle may help to lessen the duration of the ptosis and can be done either by exercising the muscle or mechanical or electrical stimulation. A well-known trick that is performed by many practitioners is the use of the back of an electric toothbrush over the muscle for several minutes a day.

If the upper eyelid ptosis requires treatment, 0.5% apraclonidine eye drops can be prescribed at a dosage of 1 to 2 drops three times a day. This is an alpha-adrenergic receptor agonist and a mydriatic agent, which causes contraction of Müller's muscle (also known as the superior tarsal muscle, it is an adrenergic muscle situated beneath the levator muscle, approximately 12mm in length and is an involuntary muscle supplied by sympathetic nerves) and may elevate the lid by 1 to 2 mm.<sup>7</sup> There is greater evidence for the successful use of apraclonidine to treat ptosis in Horner's syndrome.<sup>8</sup> There is a risk of causing miosis and closed angle glaucoma in susceptible individuals and it is prudent to check whether a patient wears glasses and their ophthalmic medical history. Apraclonidine is generally well-tolerated, but may cause some sensitivity of the eye with longer term use.

Lower lid ptosis may occur due to the overtreatment of the palpebral portion of the orbicularis oculi muscle and can have a significant impact on the functionality of the eyelid. There is no specific treatment for this complication and it usually settles within a matter of weeks; however, if an ectropion develops, prompt ophthalmological referral is recommended to prevent exposure keratitis and corneal damage.<sup>9</sup>

**Brow ptosis.** A study conducted by Carruthers and Carruthers showed that treating the glabellar complex using a seven-injection point technique and between 20 to 40 units of onabotulinumtoxinA produced significant changes in eyebrow position with an average elevation of 0.5 to 1.3mm depending on dosage and the part of the eyebrow (medial, central, or lateral).<sup>10</sup> Interestingly, the lateral part of the brow responded the earliest so it is thought that the elevation is caused by botulinum toxin type A diffusing into the medial fibers of the frontalis muscle with partial inactivation and a resultant compensatory increased resting tone throughout the whole frontalis muscle.

If a brow ptosis occurs, intradermal injection of 0.01mL (5 Speywood Units, Dysport) 2 to 3mm below the lateral brow and a further 0.01mL (5 Speywood Units, Dysport) deep injection to the corrugator at the medial brow can reduce the action of the brow depressors and result in a 1 to 2mm brow raise<sup>4</sup> (the author recommends 2 units of onabotulinumtoxinA [Botox®, Vistabel®] or incobotulinumtoxinA [Bocouture®, Xeomin®] if used instead of abobotulinumtoxinA [Azzalure®, Dysport®] with a similar 0.01mL dilution to prevent excessive spread and the risk of further complication). If a brow raise cannot be achieved, careful lowering of the other brow to provide symmetry and a better aesthetic result may be possible. These compensatory treatments should only be performed by an experienced practitioner.

One case report in the literature showed an improvement in botulinum toxin type A induced ptosis by the administration of pyridostigmine bromide at a dose of 60mg every 6 to 8 hours.<sup>11</sup> Pyridostigmine bromide is an orally active cholinesterase inhibitor that is used to treat myasthenia gravis. However, dosage and frequency is dependent on the individual, and side effects are common including severe muscle weakness. It is not recommended by the Aesthetic Complications Expert Group.

Finally, if the ptosis is causing restriction of vision, the brow or lid may need taping up to remove it from the field of vision. It is worth mentioning that botulinum toxin type A is sometimes used to purposely create a ptosis to correct lid malposition and eyelid fissure asymmetries.<sup>12</sup>

### Follow-up

All patients presenting with ptosis should be carefully followed-up and photographs should be taken to objectively assess over time. Eyelid ptosis can be objectively documented by a measurement known as MRD (margin reflex distance). The patient sits vertically upright and looking straightforward at a penlight. The distance from the eyelid margin to the corneal light reflex is the MRD and is usually greater than 2.5mm.<sup>7</sup>

If the ptosis persists, it would be sensible to consider referral to a practitioner who has more experience in this area. Good follow-up, client support, and full explanations to the client is the best approach to stop a complication from turning into a medical malpractice claim.

### References

1. Ramey NA, Woodward JA. Mechanisms of blepharoptosis following cosmetic glabellar chemodenervation. *Plast Reconstr Surg.* 2010;126:5:249–250.

## Management of Tyndall Effect

An Aesthetic Complications Expert Group Consensus Paper

2. Klein AW. Complications and adverse reactions with the use of botulinum toxin. *Semin Cutan Med Surg.* 2001;20(2):109–120.
3. Nettar K, Maas C. Facial filler and neurotoxin complications. *Facial Plast Surg.* 2012;28(3):288–293.
4. Redalli A, Forte R. How to avoid brow ptosis after forehead treatment with botulinum toxin. *J Cosmet Laser Ther.* 2003;5:220–222.
5. Fagien S. Temporary management of upper lid ptosis, lid malposition, and eyelid fissure asymmetry with botulinum toxin type A. *Plast Reconstr Surg.* 2004;114(7):1892–1902.
6. Prado AC. Caution in using botox in patients with previous frontal surgery. *Plast Reconstr Surg.* 2002;109(4):1472–1473.
7. Omoigui S, Sunday I. Case report: treatment of ptosis as a complication of botulinum toxin. *Pain Medicine.* 2005;6(2):149–151.
8. Jose M, Brown SM, Abdul-Rahim AS, Crosson CE. Ocular effects of apraclonidine in Horner syndrome. *Arch Ophthalmol.* 2000;118:951–954.
9. Vartanian AJ, Dayan SH. Complications of botulinum toxin A use in facial rejuvenation. *Facial Plast Surg Clin N Am.* 2005;13:1–10.
10. Carruthers A, Carruthers J. Eyebrow height after botulinum toxin type A to the glabella. *Dermatol Surg.* 2007;33(S1):526–531.
11. Karami M, Taheri A, Mansoori P. Treatment of botulinum toxin induced eyelid ptosis with anticholinesterases. *Dermatol Surg.* 2007;33(11):1392–1395.
12. Yücel OE, Artürk N. Botulinum toxin-A-induced protective ptosis in the treatment of lagophthalmos associated with facial paralysis. *Ophthal Plast Reconstr Surg.* 2012;28(4):256–260.

Management of Ptosis Expert Group: Martyn King, MD; Emma Davies, RN, NIP; Stephen Bassett, MD; Sharon King, RN, NIP

Management of Ptosis Consensus Group: Raj Acquilla, MD; Ben Coyle, MD; David Ecclestone, MD; Ravi Jain, MD; Harryono Judodihardjo, MD; Patrick Treacy, MD; Constance Campion, RN, NIP; Helena Collier, RN, NIP